

REMARKS

This Amendment, filed in reply to the Office Action dated March 8, 2005, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Claims 1-11 remain pending in the application. Claims 1-10 have been rejected under 35 U.S.C. § 103 as being unpatentable over Applicant's Admitted Prior Art in view of Kawajiri (U.S.P. 4,922,103) and Nakata (U.S.P. 5,477,438). Claim 11 has been rejected under 35 U.S.C. § 103 as being unpatentable over Applicant's admitted prior art in view of Kawajiri, Nakata and Kohda and NSG descriptions of GRIN and SELFOC lenses. Applicant hereinabove amends claim 1 for purposes of clarity and further respectfully submits the following comments in traversal of the prior art rejections.

Applicant's invention relates to a linear light source. A conventional known light source has an illumination profile as illustrated by Fig. 9B. As shown by lines T1 and T2, light bundles L1, L2, L3 become focused by cylindrical lenses 104, 105 on a point closer to the cylindrical lenses in a plane parallel to a row of LED chips as the distance from the axis of light emission of each of the LED chips 101, 101b, 101c increases. Thus, the light is not uniform and cannot provide a sharp image.

Applicant's invention, as illustrated by example in Fig. 2A overcomes the above deficiencies. Light sources 101a, 101b, 101c are arranged in a line, separated from a pinhole array 103 by a slit plate 102. The pinhole openings have a pitch corresponding to the pitch of the light sources, such that the pinholes are aligned with a respective optical axis of a light source. The pinhole array limits the angle of divergence of light bundles emitted from the light sources,

thereby mitigating the occurrence of flare light and non-uniformity that occurs in the conventionally known light sources. Anti-reflection coatings on the pinhole array or multiple layered arrays further reduce the likelihood of flare. Referring to a further embodiment of Fig. 10, D represents the distance between the front imaging point and back focus of the lenses 104, 105. A desired focal depth is z. Any part of the light bundle L1 imaged on a point T1 which is displaced from the surface of the recording medium 10 to be exposed within a focal depth z when $\Delta D (=D-l)$ will not be larger than the focal depth z to provide sufficient imaging properties. This results in a geometric constraint

$$2 \times \cos^{-1} \{1-(z/D)\} \geq \phi.$$

The Examiner contends that the combination of the admitted prior art, Kawajiri and Nakata teaches each feature of claim 1. However, as amended, claim 1 describes an arrangement of multiple pinhole arrays. The cumulative effect of the arrays helps to eliminate flare. Such duplication would not be taught or suggested by Kawajiri or Nakata. Kawajiri lacks any discussion for the basic alignment of light sources and arrayed openings. To the extent Nakata teaches alignment of a laser source with a confining hole, Nakata also seeks to mitigate errors attributable to alignment of elements, including alignment of plural laser sources and plural holes. The addition of yet another pinhole array plate would further complicate the alignment requirements of Nakata. Moreover, it is noted that Nakata includes a collimator for a light source for purposes of generating parallel light prior to entry to a pinhole array. Therefore, the light can be made sufficiently non-divergent even without the additional pinhole array as claimed. Therefore, claim 1 is patentable for at least this reason. Claims 2-5 are patentable based on their dependency.

With regard to independent claim 6, this claim describes geometric constraints on the line light source. In particular, divergence will be confined relative to a focus depth z and a distance between imaging points D according to $2 \times \cos^{-1} \{1-(z/D)\} \geq \phi$. The Examiner relies on inherent disclosure of the geometric arrangement in Kawajiri. This reliance on inherent disclosure is not supportable. The Examiner appears to rely on the proximity of the light source and light shielding layer as determining whether the geometric feature of claim 6 is met. However, the relevant geometric features of claim 6 include a focusing distance and focusing depth. Neither of these characteristics are discussed by the cited art. Therefore, claim 6 is patentable for this additional reason. Claims 7-11 are patentable based on their dependency.

With further regard to claim 11, the Examiner contends that the combination of the admitted prior art, Kawajiri, Nakata, Kohda and the NSG literature teaches each feature of this claim. However, Kohda and the NSG literature do not make up for the deficiencies of the admitted prior art, Kawajiri and Nakata.

Applicant adds claims 12-15 to describe features of the invention more particularly.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111
Appln. No.: 10/652,481

Attorney Docket No.: Q77240

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


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Date: September 8, 2005